# Summary of Key Points

# WHO Position Paper on Vaccines against Diphtheria, August 2017

World Health Organization

# Background

- Throughout history, diphtheria has been one of the most feared infectious diseases globally causing devastating epidemics with high case-fatality rates, mainly affecting children.

- Diphtheria remains a significant health problem in countries with poor routine vaccination coverage or pockets of unimmunized.

- From 2011–2015, India had the largest number of reported cases (18 350 cases) followed by Indonesia and Madagascar (3203 and 1633 cases, respectively).

# Disease and treatment

- Diphtheria is a disease caused by toxigenic strains of *Corynebacterium diphtheriae (C. diphtheriae).*
- Transmission occurs from person to person through droplets and close physical contact.
- Infection leads to respiratory or cutaneous diphtheria.
- Onset of respiratory diphtheria occurs after an incubation period of 2–5 days and is characterized by mild fever and an exudative pharyngitis which organizes into a pseudo-membrane causing obstruction of the airways. In rare cases organs such as the heart, kidneys and peripheral nerves are affected.
- Intravenous or intramuscular administration of equine-derived diphtheria antitoxin (DAT) is highly effective and is the gold standard for treatment.
- Case-fatality rates exceeding 10% have been reported, in particular where DAT is unavailable

# Diphtheria toxoid vaccines

- Diphtheria toxoid-containing vaccines are among the oldest vaccines in current use and are highly effective in preventing diphtheria.
- Diphtheria toxoid is available combined with tetanus toxoid (Td) as well with other antigens such as pertussis (DTwP/DTaP/Tdap) plus hepatitis B, *haemophilus influenzae* type b (Hib) and inactivated polio vaccine (IPV) as pentavalent or hexavalent vaccines.
- Administered as 3-dose primary vaccination schedule in infancy. Booster doses are needed to ensure continuing protection.
- One of the safest vaccines available. Severe reactions are rare, and to date no anaphylactic reactions attributable to the diphtheria component have been described. However, local reactions at the site of injection are common.

# WHO Position

- All children worldwide should be immunized against diphtheria. Recent diphtheria outbreaks in several countries reflect inadequate vaccination coverage and have demonstrated the importance of sustaining high levels of coverage in childhood immunization programmes.

- Every country should seek to achieve timely vaccination with a complete primary series plus booster doses. Those who are unimmunized are at risk regardless of the setting.

# WHO Position
# Vaccination Schedule

- A primary series of 3 doses of diphtheria toxoid-containing is recommended, with the first dose as early as 6 weeks of age, and the third dose completed by 6 months of age.
  - 4 week interval between doses.

- 3 booster doses of diphtheria toxoid-containing vaccine during childhood and adolescence should be given in combination with tetanus toxoid, using the same schedule: at 12-23 months of age, 4-7 years of age, and 9-15 years of age.

- National vaccination schedules can be adjusted within the age limits specified above to enable programmes to tailor their schedules based on local epidemiology, the timing of vaccination doses and other scheduled interventions, and on any other programmatic issues.

# WHO Position
# Catch-up Vaccination

- At any age, opportunities should be taken to provide or complete the 3-dose diphtheria toxoid-containing vaccine series for those who were not vaccinated, or incompletely vaccinated, during infancy.
- Two subsequent booster doses using Td or Tdap combination vaccines are needed with an interval of at least 1 year between doses.
- Opportunities for catch-up vaccination: delivery with other vaccinations such as human papillomavirus vaccination (HPV) for adolescents, during routine vaccination on entry into military services or other institutions with similar requirements, screening of vaccination status at school entry.
- To further promote immunity against diphtheria, the use of Td rather than tetanus toxoid is recommended during pregnancy to protect against maternal and neonatal tetanus in the context of prenatal care, and when tetanus prophylaxis is needed following injuries.

# WHO Position
# Special Populations

- Vaccination during pregnancy is not necessary to protect neonatal infants against diphtheria, but diphtheria- containing vaccines combined with pertussis and tetanus can be used to protect young infants against tetanus and pertussis.

- Diphtheria toxoid-containing vaccines can be used in immunocompromised persons including HIV-infected individuals.

- All health-care workers should up to date with immunization as recommended in their national immunization schedules.

# WHO position
# Vaccine co-administration

- Diphtheria toxoid-containing vaccine can be co-administered with Bacillus Calmette–Guérin, HPV, Hib, IPV, oral poliovirus, pneumococcal, meningococcal, rotavirus, measles, mumps and rubella vaccine and meningococcal conjugate vaccines.

- CRM-conjugate vaccines (such as Hib, pneumococcal and meningococcal vaccines) can be administered with or before, but not after, diphtheria toxoid-containing vaccine in the routine vaccination programme.

- When 2 vaccines are given during the same visit, they should be injected in different limbs. When 3 vaccines are given, 2 can be injected in the same limb (2.5cm apart) and the third should be injected in the other limb.

# WHO Position
# Surveillance and Reporting

- Efficient national surveillance and reporting systems, with district-level data analysis, are essential in all countries.

- Countries should report all available data on Cases of diphtheria caused by *C. diphtheriae* (and *C. ulcerans*, where laboratory capacity is available), including data from their integrated disease surveillance and response databases.

- Epidemiological surveillance ensuring early detection of diphtheria outbreaks should be in place in all countries. All countries should have access to laboratory facilities for reliable identification of toxigenic *C. diphtheriae.* Laboratory capacity should be strengthened where necessary.

# WHO Position Research

- Further studies, including serosurveys, are required to generate information on the duration of protection and the possible need for booster doses in older age groups.
- The impact of maternal Td or Tdap vaccination on infant immune responses to conjugate vaccines containing diphtheria toxoid or CRM has not been adequately studied.

**For more information on the WHO Diphtheria position paper, please visit the WHO website:**

**www.who.int/immunization/documents/positionpapers**

World Health Organization